4 May 1967

MEMORANDUM FOR THE RECORD

SUBJECT: Proposals For a Twin Stage Comparator (02227)

1. Five proposals were received and three showed some promise and understanding of the problem:

25X1

a. [redacted]

b.

c.

2. The best proposal from a technical standpoint is the one from [redacted] 25X1
They are the only one that have a satisfactory focus arrangement. They appear to have a good optical bridge for the stereo viewer. Their proposal covers all the major areas very well. The only question on this proposal, from a technical standpoint, is the stepping motors used with the track balls; there might be some apparent motion at 200X when operating at 1 micron per step and 1 step per second. The only criticism of this proposal is that they may have over designed the instrument. They are suggesting a DDP-516 where a smaller computer might do the job; they are suggesting the track balls in addition to the joystick and they suggest a sine/cosine potentiometer of the hand controls to correspond with the image motion.

25X1

3. The [redacted] proposal had a few questionable points. An unacceptable portion of this proposal is the fine focus arrangement--they suggest tilting the optical head a small amount for fine focus. They suggest the X-Y stages be moved by air bearings and a Rohlix Threadless Screw. (We cannot provide uncontaminated air with the compressor system in the building.) The speed control and dc motor will provide speeds of 1 inch per second down to .0002 inch (5 microns) per second with a wide overlap. (Is this minimum speed good enough to attain the pointing accuracy)? They suggest a [redacted] 25X1
60B encoder; we do not have any facts on the reliability of this encoder.

25X1

On the plus side, [redacted] has come up with a small inexpensive computer--the PDP-8/S that can handle themath adequately and they have experience with rectification and this type of programming. They have prepared similar computer programs for the TIIF's.

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25X1

4. The [redacted] proposal is very sketchy but does merit further consideration. Taking into account that AO is not familiar with our operation, they do have some good points.

First the bad parts of the proposal; the fine focus problem is not dealt with at all, the optical head tilting 110° so that access to the stages is questionable--the optics of the viewer may be jarred and wear may create focus problems, placing the joystick on a console at right angle to the comparator is probably the wrong location, differential drive between the stages in not covered very well (they mention rate scale factor switches on Page 17), and is a 150 watt projection lamp sufficient for the high intensity source?

Some of the good points are: fiber optic cable from lamp to point for the high intensity source should eliminate the heat problem; the optical bridge arrangement (except for 110° pivot) looks good; location of control for general focus is convenient; they seem to have a good hold on the computer and programming; aluminum castings should help keep the weight down; and six inch adjustment in height for operators.

5. The following is the pricing for the three companies:

25X1

[redacted]

6. The most logical approach for the prototype would be to develop Option 3 which is the Twin Stage Comparator with its own small on-line computer and the required interfacing to operate with the central 494 computer. Production models could later be ordered either way.

7. There are three alternate routes to choose from:

25X1

a. Negotiate with [redacted] incorporating the recommended changes in Paragraph 3, since they are experienced and are next lowest bidder.

b. Have a meeting with [redacted] engineers and discuss the required changes from Paragraph 4 and negotiate if it does not increase the price. This would also develop a new source for the Center.

25X1

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c. Ask all three contractors to rebid on the following basis:

25X1

(1) The [redacted] counters, control panel, display, and syncronizer will be used.

(2) Ball screws will be used in the drive system, air bearings and guides are not to be used.

(3) Shaft encoders are to be used, the [redacted] 25X1
25X1 [redacted] might be recommended since it is compatable with the [redacted] gear. 25X1

(4) The contractors must provide a means of fine focus for the non-measuring stage, 3 or 4/100 of an inch should be more than adequate.

(5) Contractors should consider using a smaller and less expensive computer such as the PDP-8/S since high speed computing is not critical.

8. Several contractors and members of the Development Staff have suggested 25X1
making this a four axis stereo measuring system instead of a stereo viewing system with two axis mensuration capabilities.

The reason this has not been pursued is due to the limitations of the [redacted] Stereo Viewer. Each time the rotation or Zoom is changed the reticle moves. Additional rework would have to be undertaken on the [redacted] Head before it could 25X1
be considered acceptable for a four axis system.

[redacted] 25X1

Technical Development